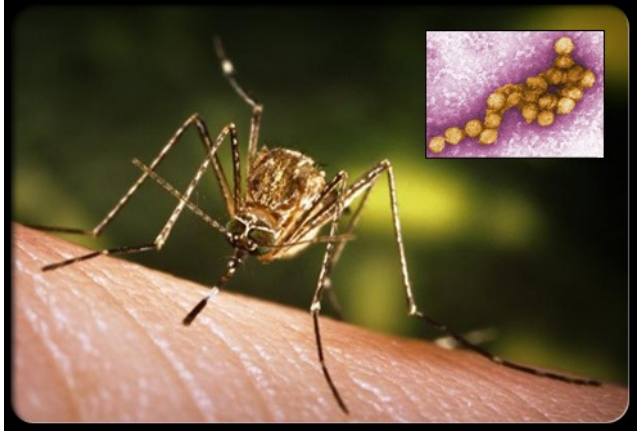


CITY OF ENNIS

DEPARTMENT OF HEALTH SERVICES

MOSQUITO CONTROL PROGRAM

- The City of Ennis has an active program for Mosquito control based on Integrated pest management (IPM) (*Main Page Content):

- The City of Ennis adheres to the U. S. Centers for Disease Control and Texas Department of State Health Services recommended mosquito surveillance and control methodology.

- Staff members are licensed through the Texas Department of Agriculture to purchase and apply insecticides for public protection. Licensure requires annual classroom training of staff.

Why Worry About Mosquitoes

- Mosquitoes transmit an array of serious viral diseases in which symptoms may include serious brain inflammation/encephalitis.

  - **Eastern equine encephalitis (EEE)** – a third of all people infected die within 2 to 10 days after onset of symptoms
  - **La Crosse encephalitis (LE)** – severe neuroinvasive disease affecting the nervous system occurs most frequently in children under the age of 16.
  - **St. Louis encephalitis (SLE)** – severe infection is marked by headache, high fever, neck stiffness, disorientation, coma, tremors, occasional convulsions (especially in infants) and paralysis.
  - **West Nile virus (WNV)** – about one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis.
  - **Western equine encephalitis (WEE) –** Symptoms range from mild flu-like illness to frank encephalitis, coma and death

    - **Dengue Fever** – symptoms such as headache, fever, exhaustion, severe muscle and joint pain, swollen glands, and rash. The presence (the "dengue triad") of fever, rash, and headache (and other pains) is particularly characteristic of dengue.

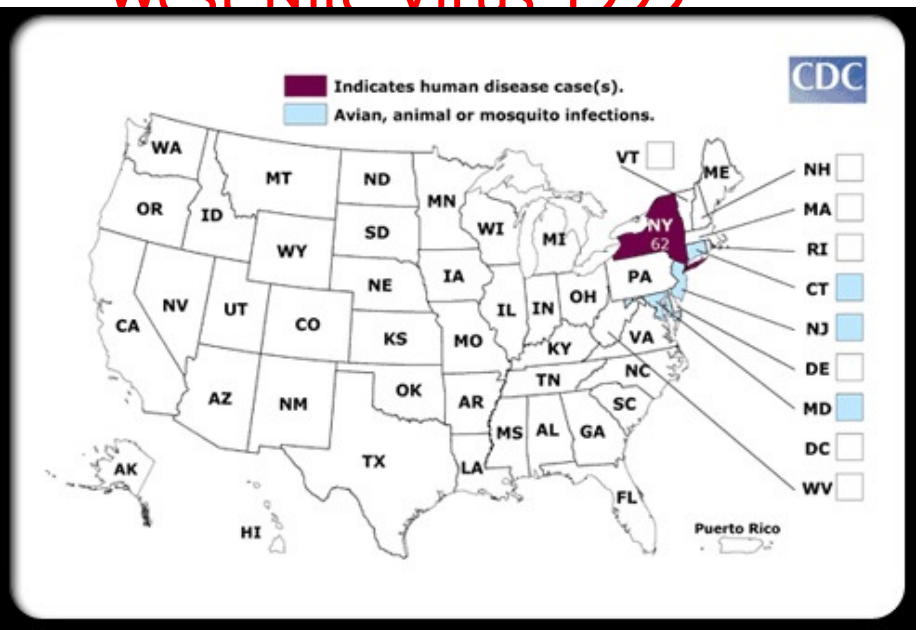
    - **Malaria** – symptoms of malaria include: Dry (nonproductive) cough. Muscle and/or back pain.Enlarged spleen malaria can lead to impaired function of the brain or spinal cord, seizures, or loss of consciousness.

- **In most recent years the West Nile virus (WNV) has been of leading concern.**

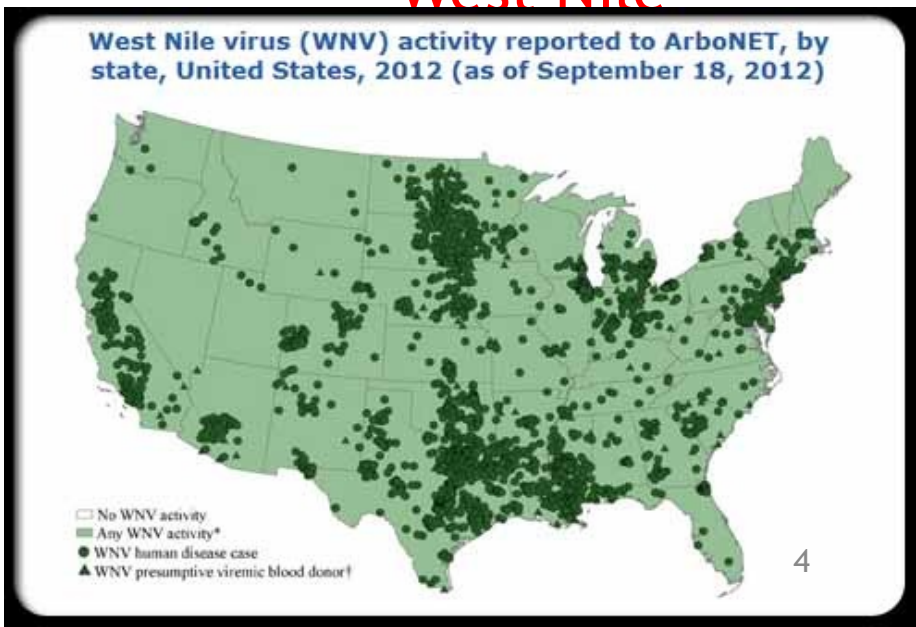
MOSQUITO CONTROL

- Outbreaks of West Nile virus have occurred in Africa, Egypt, Israel, Asia, Romania, Russia and France. Before 1999, West Nile virus had never before been found in the Western Hemisphere.
- West Nile Virus has been found throughout the U.S

West Nile Virus 1999



West Nile



West Nile Cases In Ellis County

October 31, 2012

WN Death	DOD	City	Zip	County	Onset	Age	Sex	Race	Hispanic	Diagnosis
No		Ferris	75125	Ellis	6/17/2012	45.4	F	W	Y	WN Fever
No		Waxahachie	75165	Ellis	7/9/2012	21.3	F	U	U	WN Fever
No		Ferris	75125	Ellis	6/30/2012	41.9	F	W	Y	WN Fever
No		Waxahachie	75167	Ellis	7/8/2012	56.8	M	W	N	WN Fever
No		Ferris	75125	Ellis	7/4/2012	48.2	M	W	N	WN Fever
No		Red Oak	75154	Ellis	7/20/2012	42.0	F	B	N	WN Fever
No		Waxahachie	75165	Ellis	7/20/2012	24.1	F	W	N	WN Fever
No		Waxahachie	75167	Ellis	7/27/2012	35.6	M	W	N	WN Fever
No		Waxahachie	75167	Ellis	8/1/2012	40.9	F	W	N	WN Fever
No		Waxahachie	75165	Ellis	7/30/2012	48.9	F	W	N	WN Fever
No		Waxahachie	75165	Ellis	8/6/2012	48.6	M	U	U	WN Fever
No		Waxahachie	75165	Ellis	8/10/2012	45.6	M	W	N	WN Fever
No		Midlothian	76065	Ellis	8/9/2012	29.9	F	W	N	WN Fever
No		Midlothian	76065	Ellis	8/16/2012	40.8	F	U	U	WN Fever
No		Red Oak	75154	Ellis	8/24/2012	48.2	F	U	N	WN Fever
No		Red Oak	75154	Ellis	9/9/2012	68.6	M	U	U	WN Fever
No		Midlothian	76065	Ellis	7/9/2012	1.7	F	W	N	WNND
Yes	8/3/2012	Midlothian	76065	Ellis	7/21/2012	75.2	F	W	N	WNND
No		Midlothian	76063	Ellis	7/30/2012	15.4	F	W	N	WNND
No		Ovilla	75154	Ellis	7/31/2012	38.1	F	W	N	WNND
Yes	8/28/2012	Midlothian	76065	Ellis	8/17/2012	81.5	F	W	N	WNND
No		Waxahachie	75165	Ellis	8/12/2012	60.0	M	W	Y	WNND
No		Waxahachie	75165	Ellis	8/31/2012	52.2	M	W	N	WNND
No		Red Oak	75154	Ellis	9/4/2012	54.2	F	W	N	WNND
No		Midlothian	76065	Ellis	8/15/2012	39.3	M	U	U	WNND

WN = West Nile Fever WNND = West Nile *neuroinvasive disease* ***(severe cases)*** .

To date no human WNND or WNF cases have been reported within the City of

Transmission

- Human infection is mostly the result of bites from infected mosquitoes. Mosquitoes become infected when they feed on infected birds, which circulate the virus in their blood for a few days. During blood meals (when mosquitoes bite), the viruses may be injected into humans and animals, where it can multiply and possibly cause illness.

- A very small proportion of human infections have occurred through organ transplant, blood transfusions and breast milk. There is one reported case of transplacental (mother-to-child) WNV transmission.

- To date, no human-to-human transmission of WNV through casual contact has been documented.

West Nile Virus (WNV) Transmission Cycle

West Nile virus

Birds are reservoir hosts: They amplify the virus (Die within 2-3 Days)

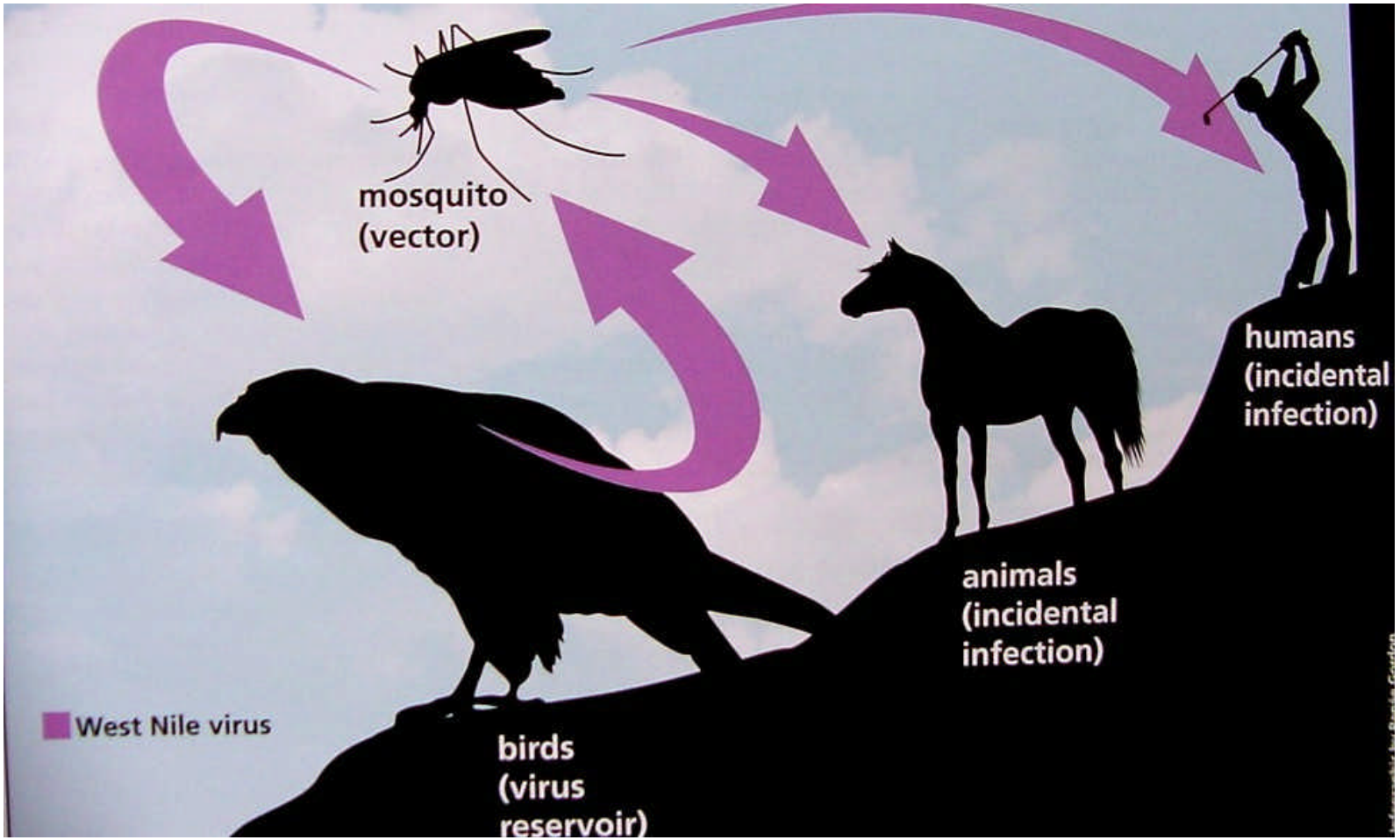
West Nile virus

Incidental Infections

People

West Nile Virus Cycle. *Mosquitoes are* the vector for WNV and birds are the usual reservoir. People, horses, and most other *mammals are* infected incidentally.

West Nile Life Cycle



Mosquitoes in a petri dish

Who Is at Risk for Getting West Nile Virus?

- All residents of areas where West Nile Virus has been identified are at risk of developing West Nile virus infection.
- People over the age of 50, and people who have medical conditions like cancer, diabetes, hypertension, kidney disease and organ transplants have the highest risk for more severe cases.
- In 2002 and 2003, more than 200 children under age 19 years in the US were reported with West Nile encephalitis or meningitis.

MOSQUITO CONTROL

- The City of Ennis Health Department mosquito control program includes:
- Surveillance for the mentioned mosquito- borne viruses of public health concern and testing,
- Mosquito/Larvae population surveillance activities,
- Water source reduction, biological control initiatives, and
- Ground application of insecticides along with public education.

Gravid Trap

Used overnight to trap mosquitoes

Water with a very unpleasant odor is used as bait

CDC light trap

Used overnight to trap mosquitoes

Dry ice that emit carbon dioxide is used as bait (It imitate human breathing)

MOSQUITO CONTROL

Gravid Trap

Light Trap

- City of Ennis Health Department monitors the mosquito population by trapping them utilizing Gravid Traps and Light Traps.
- Citizen calls are also use in the lookout for mosquito activity.
- High numbers of mosquito landings, dead birds and stagnant water sites with larvae present are all used in the surveillance effort as well.
- Dead birds are not collected for study.
- The City of Ennis began mosquito surveillance and larvacide activities in early May.

MOSQUITO CONTROL

- 4 to 8 mosquito surveillance traps are set per week during the active mosquito season.
- Mosquitoes that are collected from the traps are sent the the Texas Department of State Health Services for laboratory analyzes.
- The test result are returned to the Health Department for evaluation.

Culex quinquefasciatus

MOSQUITO CONTROL

- In 2013 the Health Department received confirmation of 6 WNV positive mosquito samples out of 240 trappings. Each of these positive mosquito samples implicated only one mosquito species, *Culex quinquefasciatus*. *The* southern house mosquito.
- 23 Areas Treated
- 31 Sprayed

- *Culex quinquefasciatus* is a timid, night-time feeder that prefers a bird blood meal, but will feed on humans and other mammals.

- The female *Culex quinquefasciatus* lays her eggs in stagnant, organic-rich water.

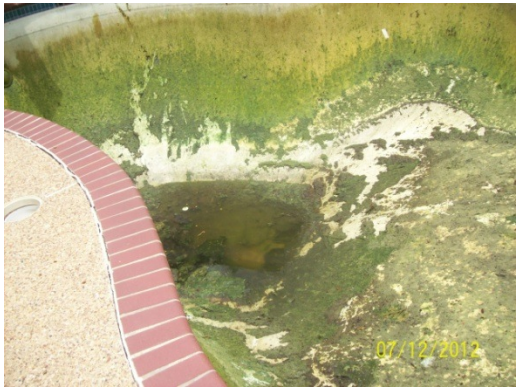
MOSQUITO CONTROL

- The City of Ennis Health Department follows U. S. Centers for Disease Control recommended program methodology.

- Staff is licensed through Texas Department of State Health Services (DSHS) to purchase and apply insecticides for public health protection. Licensure requires annual classroom training of staff.

- In addition staff must demonstrate knowledge of the biology and ecology of mosquitoes, monitoring techniques and establish what type of control to employ and in evaluating the effectiveness of the control.

Mosquito Breeding Sites/ Surveillance



Stagnate Water
Breeding Mosquitoes

Staff
Setting
A Trap

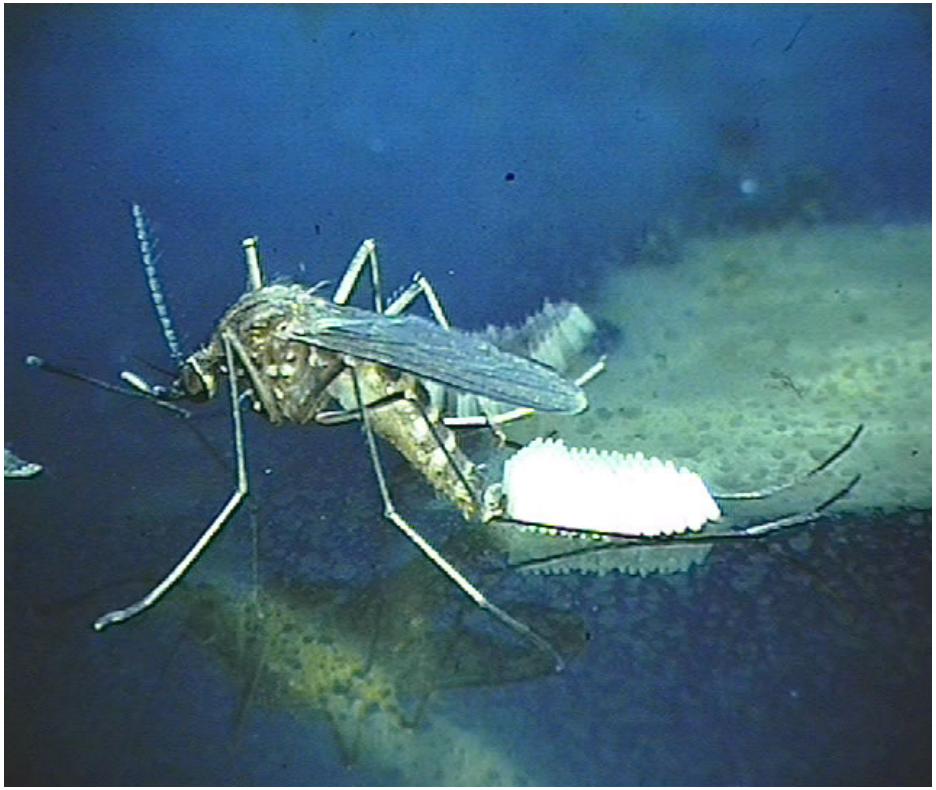
Trap
In
Operation
With Fowl
Water

MOSQUITO CONTROL

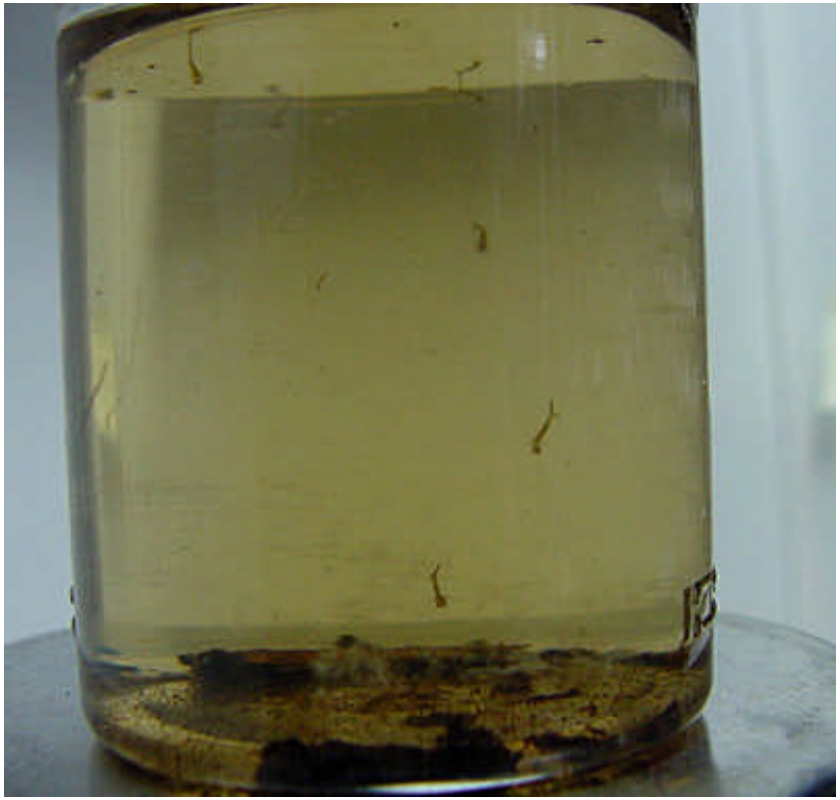
- The female deposits the egg on the water, which then hatch into larvae (sometimes called "wigglers," then pupae (or "tumbler"), then adult.

- Bats, birds and spiders are natural predators of adult mosquitoes, while fish and aquatic insects feed on the water-borne larvae.

Mosquito Larvae



A mosquito laying eggs



Mosquito larvae

MOSQUITO CONTROL

- Reducing moisture - including flooded areas, standing water, and untreated, stagnant ponds/ pools - around your home can make a significant difference in mosquito populations.

- Mosquitoes thrive in moist areas, and in fact, need them to thrive and breed. Their eggs are laid and hatch in or at the edge of standing water. The larvae then lives in the water until emerging as adults. Even a small amount of water left in a bucket, sandbox toy, bird bath, or planter, or puddles created by pooling water from a leaky hose, old tire can provide breeding ground for hundreds of mosquitoes.

MOSQUITO CONTROL

Laboratory Testing: Before pesticides are registered for use by the U.S. EPA, they must undergo laboratory testing for short-term (acute) and long-term (chronic) health effects.

Laboratory animals are purposely given high enough doses to cause toxic effects. These tests help scientists judge how these chemicals might affect humans, domestic animals, wildlife and the environment in cases of overexposure.

MOSQUITO CONTROL

Larvacides Used by the Department

- Altosid (Methropene) is a compound that mimics the action of an insect growth-regulating hormone and prevents the normal maturation of insect larvae. It is applied to water to kill mosquito larvae. It may be used with other mosquito-control measures in pest management programs. It can be applied as a liquid, pellets, or briquettes.

- Bti or Bacillus thuringiensis israelensis is a naturally occurring soil bacterium to control mosquito larvae. The larvae eat the Bti product, which is made up of the dormant spore form of the bacterium and an associated pure toxin. The toxin disrupts the gut in the mosquito by binding to receptor cells. Bti is available in liquid, granular, or briquette formulations and applied by hand (with a sprayer).

Minnow Stock Tank

MOSQUITO CONTROL

Using Biological Measure

Gambusia affinis

This minnow can help kill mosquito larvae

- The mosquito fish (Gambusia affinis) is a small surface-feeding minnow that is an efficient predator of mosquito larvae. They eliminate mosquito larvae before they hatch into the adult mosquito.

- The Gambusia is a native Texas minnow that can tolerate high water temperatures, low dissolved oxygen levels and some water pollutants found in urban creeks. They can survive in water temperatures as low as 33° F and as high as 100° F.

- The City of Ennis has began to stock and utilize these minnows to eliminate mosquito larvae in standing pools of water in ditches, low flowing streams and natural stagnant water pools.

MOSQUITO CONTROL

Each call is logged and responded to by staff

- Ennis Health Department uses three agents for larviciding:
  - Summit B.T.I. *(Bacillus thuringiensis)* Briquets
  - Zoecon® Altosid Pellets
  - Agnique MMF
- These chemicals are nontoxic and environmentally safe
- The Department implemented the use of bio-controls (bacterial products such as Bti and minnow
- *Gambusia minnow* fish (Minnow)

Minnow Trap →

MOSQUITO CONTROL

- Localized adult mosquito populations which exceed the action threshold or a positive mosquito sample indentified staff will begin an application of insecticide dispersed from truck-mounted, ultra low volume (ULV), aerosol sprayer.
- The principle insecticide applied for adult mosquito control is permethrin, synergized with piperonyl butoxide (PBO).
- ULV units disperse the synergized pyrethroid insecticides (0.003 lb. active ingredient per acre) over an effective swath width of 300 feet.
- Applications ideally are made when mosquito activity is high between 9:30p.m. and 2:00a.m., with the wind speed between 2 to 10 mph.

MOSQUITO CONTROL

- The spray truck is operated at night after 9:30p.m. to reduce human & beneficial insect exposure. *(Tuesday and Thursday)*

Truck-mounted ULV machine for adulticiding

MOSQUITO CONTROL

Control of Adult Mosquitoes

- The Ennis Health Department sprays **Aqualuer 20-20**
- The active chemical agent in Aqualuer is **permethrin. Permethrin** has a very low toxicity level .
- Mixed with water at a rate of 6 part water to 1 part chemical it is applied at 5.0 ounces per minute with the truck driving at 10 mph.
- Only 5/100ths of a teaspoon of active agent in a microscopic mist lands on a typical residential lot (1/4 acre). The swath wide is generally 300 feet.

The Department may occasionally hand sprays **Talstar** with the active ingredient being Bifenthrin another **permethrin based product.** Mixed with water at a rate of 1 ounce per gallon of water. Talstar is mostly use to treat hard to get to areas away from lakes and streams.

Aqualuer 20-20 Ground Spray

- This insecticide resembles naturally occurring plant products, which are toxic to insects.

- This insecticide is among the least harmful products available, breaks down rapidly in the environment, and poses almost no risk to people and pets in the concentrations being used for mosquito control.

MOSQUITO CONTROL

- The City of Ennis completed seventeen (17) weeks of mosquito control (abatement) activities between July – November 1, 2012.
- During the first four (4) weeks of mosquito control activities, targeted areas were sprayed.
- During the last thirteen (13) weeks, 95% of the populated area of Ennis were sprayed each week (thirteen [13] times).
- In addition to spraying, biological control (mosquito fish) and larvacide were applied to active mosquito pools for the seventeen week period.
- **In 2013 to date, no confirmed human West Nile Cases have been reported within the City of Ennis.**

FREQUENT QUESTIONS FOR WEST NILE SPRAYING

- What days of the week do you spray?

Tuesday's and Thursday.

- What times of the day/night do you spray?

Between 9:30 p.m. to 1:00 a.m.

- What weather conditions prevent you from spraying?

Heavy to moderate rains and/or wind conditions above 10 mph.

- How long does the spray last?

Approximate duration is 1 hour after it is dispensed.

- What does the spray look like?

White cloud which dissipates quickly into the air and is invisible at that point.

- Do you spray in the street or alley?

Only streets.

FREQUENT QUESTIONS FOR WEST NILE SPRAYING

- Do you spray on private property?
- Only from the street.

- Do you spray the on school property?
- Yes, when the public is not present.

- How do you determine which areas of the city to spray?

Criteria is:

1. Human case(s) of West Nile Virus
2. Positive West Nile Mosquitoes found during trapping
3. Area of heavy mosquito populations
4. High population of people
5. Area as designated by the Department to represent a potential for heavy mosquito breeding
6. An epidemic may call for City Wide

- I have asthma – will the chemical from the spray harm me?
- The chemical used in spraying should have little effect on individuals with asthma; however individuals should take steps to minimize exposure to any pesticide.

- Will it kill the dragon flies and lady bugs?
- As these insects are not typically active during the spray times the effect on them should be minimal.

FREQUENT QUESTIONS FOR WEST NILE SPRAYING

- Will the spray harm or kill the birds and squirrels?
- No, the chemical used is specific for insects

- Do I need to bring in my pet food?
- As a precaution pet food should be brought inside

- Do I need to bring in my pets?
- As a precaution pets should be brought inside

- Do I need to cover my pool?
- Swimming Pools - No
- Fish Ponds - Yes

- Will it harm my garden?
- No, but remember to wash vegetables before eating them as you normally would

FREQUENT QUESTIONS FOR WEST NILE SPRAYING

- I have children – do I need to clean the outdoor toys after spraying?
- No, however as a precaution outdoor toys can be washed with soap and water to minimize contact.

- How many cases of human WNV have we had in Ellis County in the past few of years?
- 25 cases as of October 31, 2012 (including two deaths) there were no confirmed human cases in 2013.

- Once you have had WNV can you get the virus again?
- Check with your physician. It is assumed that immunity from West Nile virus will be lifelong. However, it is possible that immunity may wane in later years.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **Is West Nile Virus Seasonal in Its Occurrence?**

- The risk of infection is highest during mosquito season and does not lower until mosquito activity ceases for the season (when freezing temperatures occur). Once the low night time temperature is continuously below 60 °F. In certain climates where temperatures are warmer, West Nile virus infections can occur year-round.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **How Long Do Symptoms Last?**
- The incubation period (time from infection to onset of disease symptoms) in humans for West Nile virus is usually 3 to 14 days.

- Symptoms will generally last a few days, although even some healthy people report having the illness last for several weeks. The symptoms of severe disease (encephalitis or meningitis) may last several weeks, although neurological effects may be permanent.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **If I Have West Nile Fever, Can It Turn Into West Nile Encephalitis?**

- When someone is infected with West Nile virus (WNV), they will typically have one of three outcomes: no symptoms (most likely), West Nile fever (WNF in about 20% of people), or severe West Nile disease, such as meningitis or encephalitis (less than 1% of those who get infected). *If you develop a high fever with severe headache, consult your doctor.*

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **If I Have West Nile Fever, Can It Turn Into West Nile Encephalitis?**

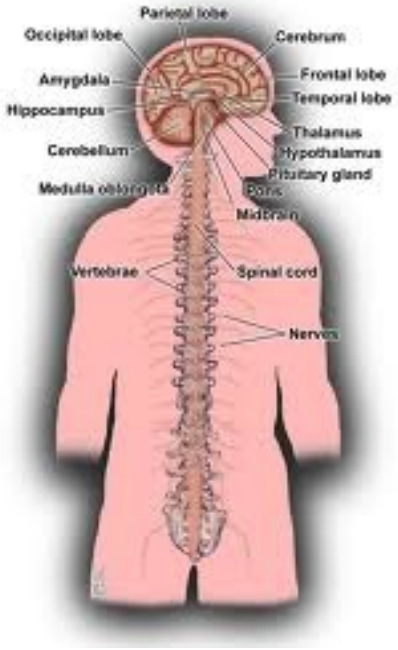
- The good news is about 80 percent of people who are infected with the virus won't show any symptoms at all. Up to 20 percent, however, may develop a fever, headache, body aches, vomiting, swollen lymph glands or a skin rash. These symptoms may last a few days or a few weeks, even in otherwise healthy people.

- But about one in 150 people will develop a severe illness, in which they may have a high fever, neck stiffness, convulsions, vision loss, paralysis, coma or other neurological effects that may be permanent.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **If I Have West Nile Fever, Can It Turn Into West Nile Encephalitis?**

- From studies we know that only about one in every five people who get infected with West Nile will actually develop symptoms. The most common ones are fever, headaches, body ache, joint pain, vomiting, diarrhea and rash. A lot of people who develop symptoms usually just wait it out at home. Or they'll go to a medical doctor and end up recovering from their illness and feeling much better within several weeks. Sometimes, people will complain of fatigue or report feeling not quite themselves for several months.



FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **How Does West Nile Virus Actually Cause Severe Illness and Death in Humans?**

- Following transmission by an infected mosquito, West Nile virus multiplies in the person's blood system and crosses the blood-brain barrier to reach the brain. The virus interferes with normal central nervous system functioning and causes inflammation of brain tissue.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **What Is the Treatment for West Nile Virus? Is There a Vaccine?**

- The diagnosis of West Nile virus infection is confirmed with a blood or cerebrospinal fluid test. There is no specific treatment for West Nile virus infection. Mild illness does not require therapy other than medications to reduce fever and pain. Intensive supportive therapy is directed toward the complications of brain infections. Anti-inflammatory medications, intravenous fluids, and intensive.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- **What Can a Community Do to Reduce the Risk of West Nile Virus?**
- First, a community can monitor the bird population, including surveillance of birds that are sick or have died of disease.
- Second, the community can watch out for stagnant water, particularly if it is nutrient-laden; it is inviting for Culex mosquitoes.
- Third, widespread mosquito-control efforts, including the use of spraying, biological control and larvacide, may be needed. However, even with rigorous surveillance, spraying, and larvaciding, the virus may still infect people.

FREQUENT QUESTIONS FOR WEST NILE VIRUS

- How do you find out if you have West Nile? Is there a test?

- People who have symptoms that concern them should see a health care provider. If they think they have West Nile, they can have their blood tested for the presence of antibodies or, in more severe cases that affect the central nervous system, a doctor can take samples of the cerebrospinal fluid that surrounds the brain and spinal cord.

Mosquito Control Myths

- Electrocuting devices, popularly known as "bug zappers", do not control mosquitoes.
- Citronella plants. While citronella oil does have proven mosquito-repellent properties, the genetically-modified plants sold for this purpose do not.
- Electronic devices that transmit sounds to mimic male mosquitoes or dragonflies do not work.

MOSQUITO CONTROL

Take a look around

- Rain gutters are another area that can accumulate water. Inspect gutters on a regular basis to minimize debris buildup and water collection.
- Whatever method you decide to use to control mosquitoes, be sure it's cost effective and environmentally safe. Consider alternatives before applying a conventional chemical insecticide.
- Look around your yard. Are there old tires that could be removed? Are containers inverted so they don't accumulate water? These are ideal areas to accumulate water and produce hundreds of mosquitoes. Check your yard regularly to be sure no potential problem areas exist.

MOSQUITO CONTROL

What can people do to prevent becoming infected with West Nile virus?

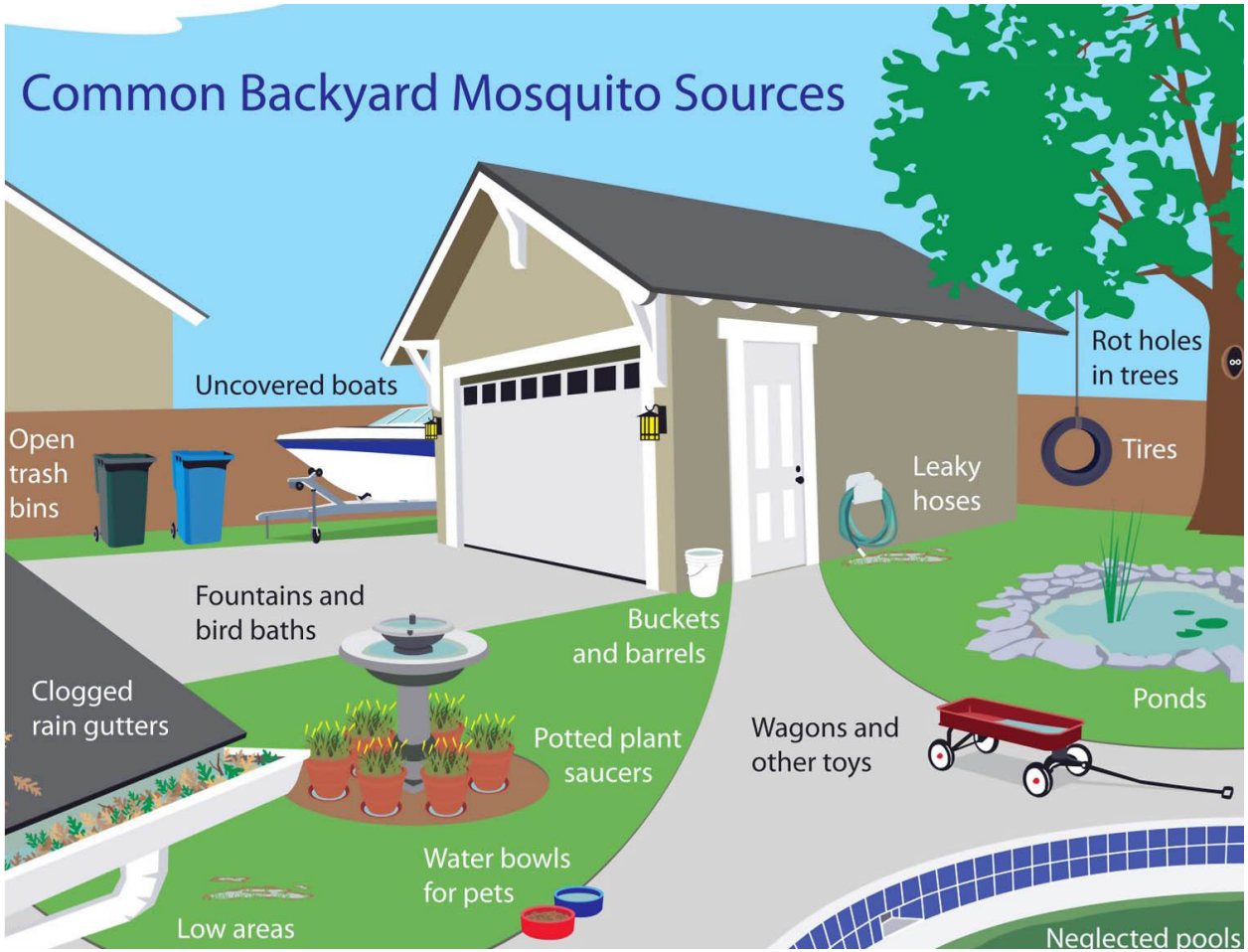
The best way to avoid West Nile virus infection is to prevent mosquito bites. There is no vaccine or preventive drug.

Prevention tips for West Nile virus include:

- Remembering the four D's: DRAIN, DRESS, "DEET", and DUSK/ DAWN.
- Drain standing water around homes to reduce mosquito hatching grounds.
- Dress in pants and long sleeves when outside in mosquito-infested areas, but avoid becoming too hot.
- Apply an insect repellent that contains DEET (N,N-diethyl-m-tolumide) to exposed skin and clothing when outdoors.
- Stay indoors at dusk and dawn, when mosquitoes are most active.

- When dealing with West Nile virus, mosquito bite prevention is your best bet.

- Fighting mosquito bites reduces your risk of getting West Nile virus, along with other illnesses that mosquitoes can carry.


Common Backyard Mosquito Sources
Uncovered boats
Open trash bins
Rot holes in trees
Tires
Leaky hoses
Fountains and bird baths
Buckets and barrels
Clogged rain gutters
Potted plant saucers
Wagons and other toys
Ponds
Water bowls for pets
Low areas
Neglected pools

- We will be inspecting on a continual, rotating basis throughout the summer, nearly 400 separate locations within the City of Ennis that are known to have the potential to hold smaller amounts of water and breed mosquitoes. Sites that are found to contain larvae will be treated.

- In addition, citizens are encouraged to eliminate breeding sites around the home such as stagnant water in birdbaths, gutters and garden pots.

CITY OF ENNIS

- To Report Mosquito Related Problems or For Additional Information Regarding This Presentation Please Feel Free to Contact the City of Ennis Health Department at: 972-875-1234 or by Email at: healthdept@ennis-texas.com